

We claim:

- C1 Sub 13
1. A method for scheduling a complex activity that uses consumable resources and is governed by a set of pre-defined constraints, wherein an unacceptable schedule exists for the activity, the method comprising the steps of:
 - establishing the unacceptable schedule as a current schedule;
 - calculating a score for the current schedule;
 - repairing one or more of the constraint violations of the current schedule by modifying the current schedule;
 - determining a revised schedule from the schedule modification or modifications made by the constraint violation repair or repairs;
 - calculating a score for the revised schedule;
 - selecting one of the revised schedule or the current schedule as the new current schedule based upon a comparison of the score of the revised schedule and the score of the current schedule;
 - repeating, until a predetermined condition is met, the steps of repairing one or more of the constraint violations of the current schedule, determining a revised schedule, calculating a score for the revised schedule, and selecting one of the revised schedule or the current schedule as the new current schedule; and
 - selecting one of the revised schedules as the final schedule.

2. A method as in Claim 1, wherein the step of selecting a new current schedule further comprises the step of selecting as the new current schedule the schedule that has the better score.

3. A method as in Claim 1, wherein the step of selecting a new current schedule further comprises the step of occasionally selecting as the new current schedule the

schedule that has the worse score.

4. A method as in Claim 1, wherein the step of selecting a final schedule further comprises the step of selecting the most recently determined current schedule as
5 the final schedule.

5. A method as in Claim 1, further comprising the step of storing the revised schedule having the best score, and wherein the step of selecting a final schedule further comprises the step of selecting the revised schedule having
10 the best score as the final schedule.

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6. A method as in Claim 1, wherein the score is a function of the relative importance of each constraint and the degree of violation of each constraint.

7. A method as in Claim 1, wherein:
15 the score is a function of a multiplicity of penalties and weights;
one penalty is associated with each constraint, each penalty representing the degree of violation, if any, of the constraint; and
20 one weight is associated with each constraint, each weight representing the relative importance of the constraint.

8. A method as in Claim 1, wherein the constraint violations are repaired so that the repaired constraint
25 violation or violations are less severe than before the repair.

9. A method as in Claim 1, wherein the predetermined condition is obtaining a schedule having a score that is better than a predetermined threshold score.

10. A method as in Claim 1, wherein:
the activity is a manufacturing operation; and
the consumable resources are inventory.

11. A method as in Claim 1, wherein:

5 the activity is a maintenance and repair
operation; and

the consumable resources are components or
materials used to effect the maintenance or repair.

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12. A system for scheduling a complex activity that
10 uses consumable resources and is governed by a set of pre-
defined constraints, wherein an unacceptable schedule exists
for the activity, comprising:

a memory device, wherein:

15 the memory device is capable of storing an
unacceptable initial schedule that is supplied to
the system;

the memory device stores information
regarding each of the constraints; and

20 the memory device is capable of storing one
or more revised schedules produced by the system;
and

a processing device, wherein:

25 the processing device is capable of
calculating a score for each schedule;

the processing device is capable of repairing
one or more constraint violations for each
schedule by modifying the schedule;

30 the processing device is capable of
determining each revised schedule from the
schedule modification or modifications made by the
constraint violation repair or repairs;

the processing device is capable of selecting
one of the revised schedule or the current
schedule as the new current schedule based upon a

comparison of the score of the revised schedule and the score of the current schedule; and

the processing device is capable of selecting one of the revised schedules as the final schedule determined by the system.

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13. A system as in Claim ~~12~~, wherein:

the memory device is capable of storing the revised schedule having the best score; and

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the processing device is capable of selecting the revised schedule having the best score as the final schedule.

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14. A system as in Claim ~~12~~, wherein:

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the constraint information stored by the memory device includes a description of the constraint, a penalty function, a constraint weight, and a repair method for the constraint;

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the score calculated by the processing device for each schedule is a function of the penalty caused by the schedule for each constraint and the weight for each constraint; and

the repair performed by the processing device for each constraint violation is performed using the repair method associated with the constraint.

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15. A system as in Claim ~~12~~, further comprising a user input device.

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16. A system as in Claim ~~12~~, further comprising a display device.

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17. A system as in Claim ~~12~~, wherein:

the activity is a manufacturing operation; and the consumable resources are inventory.

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18. A system as in Claim ¹³~~12~~, wherein:

the activity is a maintenance and repair operation; and

the consumable resources are components or materials used to effect the maintenance or repair.

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